IN THE SPECIFICATION:

Please substitute the following paragraph for the paragraph starting at page 3, line 2 and ending at line 14.

However, with the increased resolution of printed images, an enormous amount of data must be processed in the printing apparatus. Thus, with a print system composed of an image processing section and an ink jet printing section, the throughput of the whole system may decrease sharply because of the speed at which the image processing section processes data or the speed at which the image processing section transfers data to the ink jet printing section. Further, with the increased resolution of printed images, it is necessary to increase the capacity of memory required in the ink jet printing apparatus main body in order to store data. This may ~~increases~~ increase the cost of the printing apparatus.

Please substitute the following paragraph for the paragraph starting at page 3, line 23 and ending at page 4, line 9.

A systematic dither method is a typical one of the multivalued quantization methods for the image processing section, i.e. the conversions into n values ($n \geq 3$). The systematic dither method uses dither matrices in which thresholds irrelevant to an input image are regularly arranged and repeatedly arranges dither matrices in a vertical direction and a horizontal direction. Then, the gradation of the input images is expressed by n values ($n \geq 3$) on the basis of the input image and the thresholds ~~on~~ of the corresponding dither matrix. With the common systematic dither process, the regular arrangement (hereinafter also referred to as the "gradation pattern") of the thresholds is of a dot distribution type or a dot concentration type.

Please substitute the following paragraph for the paragraph starting at page 5, line 12 and ending at line 24.

Further, Patent Document 1 describes an arrangement in which as a dot pattern with a gradation value of "1" such as the one shown in Fig. 14B, a plurality of dot patterns are provided which are different in the position of each dot in a 2 × 2 dot matrix so that the dot pattern used can be sequentially changed. Similarly, a plurality of dot ~~patters~~ patterns with a gradation value "2" or "3" such as those shown in Figs. 14C and 14D are provided so that the dot pattern used can be sequentially changed. The dot pattern used may be sequentially changed during a single printing scan operation or in accordance with the printed position of the image or may be randomly changed.

Please substitute the following paragraph for the paragraph starting at page 6, line 9 and ending at line 18.

With an ink jet printing apparatus based on, for example, a method of utilizing thermal energy to bubble ink to eject ink droplets, images may be degraded ~~which~~ that are printed using those of the plurality of nozzles of a print head capable of ejecting ink ~~which~~ that are particularly frequently used to eject the ink for printing over a long period. This may be because dyes or impurities in the ink ~~is~~ are thermally solidified and deposited on heater surfaces of electrothermal converters used to supply thermal energy to the ink.

Please substitute the following paragraph for the paragraph starting at page 6, line 19 and ending at page 7, line 3.

In the above conventional example, if the systematic dither method is used to print images constantly over a long period, the nozzles in the print head are not uniformly degraded. As shown in Fig. 15, degraded nozzles through which, for example, ink cannot properly ~~ejected~~ eject appear periodically in the direction in which the nozzles are arranged. This is because the nozzles corresponding to the fixed periodic pattern are used (ink ejection) more frequently than the others. In Fig. 15, the period corresponds to 16 nozzles in turn corresponding to the size of the gradation patterns based on the systematic dither method.

Please substitute the following paragraph for the paragraph starting at page 7, line 4 and ending at line 19.

This is because the gradation patterns based on the systematic dither method ~~is~~ are repeatedly used in the vertical and horizontal directions within the area in which image data is present, so that the gradation pattern is fixed with respect to the image data. Another cause is that before and after the print head carries out a printing scan in the horizontal direction (main scanning direction), the distance the print head and a printed medium are relatively moved in the vertical direction (sub-scanning direction) becomes an integral multiple of the size of the gradation pattern (or the size of the gradation pattern becomes an integral multiple of the distance the print head is moved relative to the printed medium in the vertical direction during printing scans), so that there is a fixed relationship between the gradation pattern and the positions of the nozzles in the print head.

Please substitute the following paragraph for the paragraph starting at page 7, line 26 and ending at page 8, line 18.

For example, Figs. 10B to 10F show the use (ink ejection) frequency of the nozzles used to print images of half tone densities (duty: 5, 10, 15, and 25%) using the gradation patterns shown in Fig. 13 and the dot patterns shown in Fig. 14. In this case, in order to emphasize the characteristics of the problem, dot patterns are used in which one dot is arranged in a 2 × 2 dot matrix as shown in Fig. 10A. The use (ink ejection) frequency of the nozzles is periodical on the basis of the size of the gradation patterns based on the systematic dither method, shown in Fig. 13. Thus, the use (ink ejection) frequency of the nozzles shown in Figs. 10B to 10F corresponds to the number of times (probability) those nozzles are used ~~which are used~~ to print an area of 16 × 16 dots using the gradation patterns (8 × 8) in Fig. 13. If, for example, an image of duty 5% is to be printed as shown in Fig. 10B, nozzles 1 and 9 are used twice ~~owing~~ due to the relationship between the gradation patterns (8 × 8) in Fig. 13 and the printing area (16 × 16 dots) and the operated nozzles of the print head as shown in Fig. 17.

Please substitute the following paragraph for the paragraph starting at page 9, line 3 and ending at line 21.

Further, when degraded nozzles through which, for example, ink cannot properly ~~ejected~~ eject appear significantly periodically, one of a nozzle number L and a nozzle number K is an integral multiple of the other, i.e. the following relationship is established: K = L × a (a is a natural number) or L = K × b. K is the number of nozzles in the print head corresponding to the amount by which a printed medium is conveyed while the print head carries out forward and backward printing scans. Specifically, in an ink jet printing apparatus based on the serial scan method of repeating a printing scan in the main scanning direction of a print head and the conveyance of a printed medium in the sub-scanning direction (along the direction in

which nozzles are arranged), K is the number of nozzles in the print head corresponding to the amount by which the printed medium is conveyed. Further L is the size of the gradation patterns based on the systematic dither method in the nozzle arrangement direction and corresponds to the number of nozzles.

Please substitute the following paragraph for the paragraph starting at page 10, line 19 and ending at page 11, line 1.

In the first aspect of the present invention, there is provided an ink jet printing apparatus based on a serial scan method which prints on a printing medium by using a print head formed with a plurality of nozzles through which ink can be ejected and selectively ejecting ink through the plurality of nozzles in the print head in accordance with dot patterns of dot matrices corresponding to respective gradation values, on the basis of image data converted into n values ($n \geq 3$) using gradation patterns for a systematic dither method, the apparatus comprising:

Please substitute the following paragraph for the paragraph starting at page 11, line 2 and ending at line 4.

main scanning means for scanning the print head over the ~~printed~~ printing medium in a sub-scanning direction different from a direction in which the nozzles are arranged;

Please substitute the following paragraph for the paragraph starting at page 11, line 19 and ending at page 12, line 1.

In the second aspect of the present invention, there is provided an ink jet printing apparatus based on a serial scan method which prints on a printing medium by using a

print head formed with a plurality of nozzles through which ink can be ejected and selectively ejecting ink through the plurality of nozzles in the print head in accordance with dot patterns of dot matrices corresponding to respective gradation values, on the basis of image data converted into n values ($n \geq 3$) using gradation patterns for a systematic dither method, the apparatus comprising:

Please substitute the following paragraph for the paragraph starting at page 12, line 18 and ending at line 27.

In the third aspect of the present invention, there is provided an ink jet printing apparatus based on a serial scan method which prints on a printing medium by using a print head formed with a plurality of nozzles through which ink can be ejected and selectively ejecting ink through the plurality of nozzles in the print head in accordance with dot patterns of dot matrices corresponding to respective gradation values, on the basis of image data converted into n values ($n \geq 3$) using gradation patterns for a systematic dither method, the apparatus comprising:

Please substitute the following paragraph for the paragraph starting at page 13, line 16 and ending at line 25.

In the fourth aspect of the present invention, there is provided an ink jet printing apparatus based on a serial scan method which prints on a printing medium by using a print head formed with a plurality of nozzles through which ink can be ejected and selectively ejecting ink through the plurality of nozzles in the print head in accordance with dot patterns of dot matrices corresponding to respective gradation values, on the basis of image data converted

into n values ($n \geq 3$) using gradation patterns for a systematic dither method, the apparatus comprising:

Please substitute the following paragraph for the paragraph starting at page 14, line 22 and ending at line 26.

wherein the first changing means shifts the correspondences between the image data and the plurality of nozzles and the second changing means changes the dot ~~patters~~ patterns, for each page or each print job or every time a certain number of print sheets are printed.

Please substitute the following paragraph for the paragraph starting at page 14, line 27 and ending at page 15, line 9.

In the fifth aspect of the present invention, there is provided an ink jet printing method based on a serial scan method which prints on a printing medium by using a print head formed with a plurality of nozzles through which ink can be ejected and selectively ejecting ink though the plurality of nozzles in the print head in accordance with dot patterns of dot matrices corresponding to respective gradation values, on the basis of image data converted into n values ($n \geq 3$) using gradation patterns for a systematic dither method, the ink jet printing method comprising:

Please substitute the following paragraph for the paragraph starting at page 15, line 13 and ending at line 19.

a conveying step of conveying the ~~printed~~ printing medium by a predetermined amount K (where $K = a \times L$ (a is a natural number and L is the size of the gradation patterns in

the direction in which the nozzles are arranged) or K = L/b (b is a natural number)) in the direction in which the nozzles are arranged, between a preceding scan and a next scan of the print head;

Please substitute the following paragraph for the paragraph starting at page 15, line 27 and ending at page 28, line 9.

In the sixth aspect of the present invention, there is provided an ink jet printing method based on a serial scan method which prints on a printing medium by using a print head formed with a plurality of nozzles through which ink can be ejected and selectively ejecting ink through the plurality of nozzles in the print head in accordance with dot patterns of dot matrices corresponding to respective gradation values, on the basis of image data converted into n values ($n \geq 3$) using gradation patterns for a systematic dither method, the ink jet printing method comprising:

Please substitute the following paragraph for the paragraph starting at page 16, line 26 and ending at page 17, line 8.

In the seventh aspect of the present invention, there is provided an ink jet printing method based on a serial scan method which prints on a printing medium by using a print head formed with a plurality of nozzles through which ink can be ejected and selectively ejecting ink through the plurality of nozzles in the print head in accordance with dot patterns of dot matrices corresponding to respective gradation values, on the basis of image data converted into n values ($n \geq 3$) using gradation patterns for a systematic dither method, the ink jet printing method comprising:

Please substitute the following paragraph for the paragraph starting at page 17, line 24 and ending at page 18, line 6.

In the eighth aspect of the present invention, there is provided an ink jet printing method based on a serial scan method which prints on a printing medium by using a print head formed with a plurality of nozzles through which ink can be ejected and selectively ejecting ink through the plurality of nozzles in the print head in accordance with dot patterns of dot matrices corresponding to respective gradation values, on the basis of image data converted into n values ($n \geq 3$) using gradation patterns for a systematic dither method, the ink jet printing method comprising:

Please substitute the following paragraph for the paragraph starting at page 19, line 3 and ending at line 6.

wherein the first changing step shifts the correspondences between the image data and the plurality of nozzles and the second changing step changes the dot ~~patters~~ patterns, for each page or each print job or every time a certain number of print sheets are printed.

Please substitute the following paragraph for the paragraph starting at page 23, line 10 and ending at page 24, line 2.

In Fig. 2, reference numeral 11 denotes a carriage provided removably with a head cartridge in which a print head and ink tanks reserving ink are integrated together. Reference numeral 12 is a carriage motor that reciprocates the carriage 11 in a main scanning direction shown by an arrow X. Reference numeral 4 denotes a belt that transmits the driving force of the carriage motor 12 to the carriage 11. Reference numeral 6 denotes a guide shaft that

supports the carriage 11 so that it can be moved in the main scanning direction. The belt 4 is extended between pulleys 5a and 5b. Reference numeral 13 denotes a flexible cable used to transfer an electric signal from a control section, described later, to the print head. Reference numeral 15 denotes a cassette in which printing media (for example, print sheets) are stacked. Reference numeral 16 denotes an encoder used to read optically the position of the carriage 11. A conveying mechanism, not shown, is used to convey a ~~printed~~ printing medium from the cassette 15 in a sub-scanning direction shown by an arrow Y and crossing the main scanning direction.

Please substitute the following paragraph for the paragraph starting at page 28, line 3 and ending at line 20.

Reference numeral 44 denotes a dot pattern expanding section that selects one of a plurality of dot patterns corresponding to the respective gradation values, on the basis of a gradation value quantized by the quantizing section 41. The selected desired dot pattern is obtained from a dot pattern storing section 45. The dot pattern storing section 45 stores the plurality of dot patterns corresponding to the respective gradation values. The dot pattern storing section 45 selects a desired one of the plurality of dot patterns on the basis of dot pattern selection information inputted from the dot pattern expanding section 44. The dot pattern storing section 45 then outputs the selected dot pattern to the dot pattern expanding section 44. The dot pattern storing section 45 is provided in a semiconductor memory such as an EEPROM. However, in the image printing apparatus according to the present invention, it may be copied to a fast memory such as a ~~SPAM~~ SRAM in order to increase [[a]] the processing speed.

Please substitute the following paragraph for the paragraph starting at page 42, line 8 and ending at line 18.

In the present embodiment, during the first scan, the positions of the operated nozzles are changed for each page of the printed image. However, the present invention is not limited to this aspect. For example, if the positions of the operated nozzles for the first scan of the print head cannot be changed for each page of the printing sheet on which the image is printed, then the positions may be changed every time a certain number of print sheets are printed. In this case, the use frequency of all nozzles in the print head can be ~~uniformed in proportion to increase~~ made uniform by increasing the number of ~~performing the~~ nozzles that perform printing ~~cover~~ over a long period.

Please substitute the following paragraph for the paragraph starting at page 42, line 19 and ending at line 27.

In the present embodiment, the 2 × 2 dot patterns correspond to the common gradation patterns based on the systematic dither method. Further, the dot ~~patters~~ patterns are not only changed for each scan of the print head 1 but the positions of the nozzles used during the first scan are changed for each page of the printed image. This makes it possible to avoid the degradation of images attributed to the biased use of particular nozzles, which is a problem with the recent ink jet apparatuses.

Please substitute the following paragraph for the paragraph starting at page 47, line 1 and ending at line 6.

The present invention can be also applied to a so-called full-line type recording head whose length equals the maximum length across a recording medium. Such a recording head may ~~consists~~ consist of a plurality of recording heads combined together, or one integrally arranged recording head.